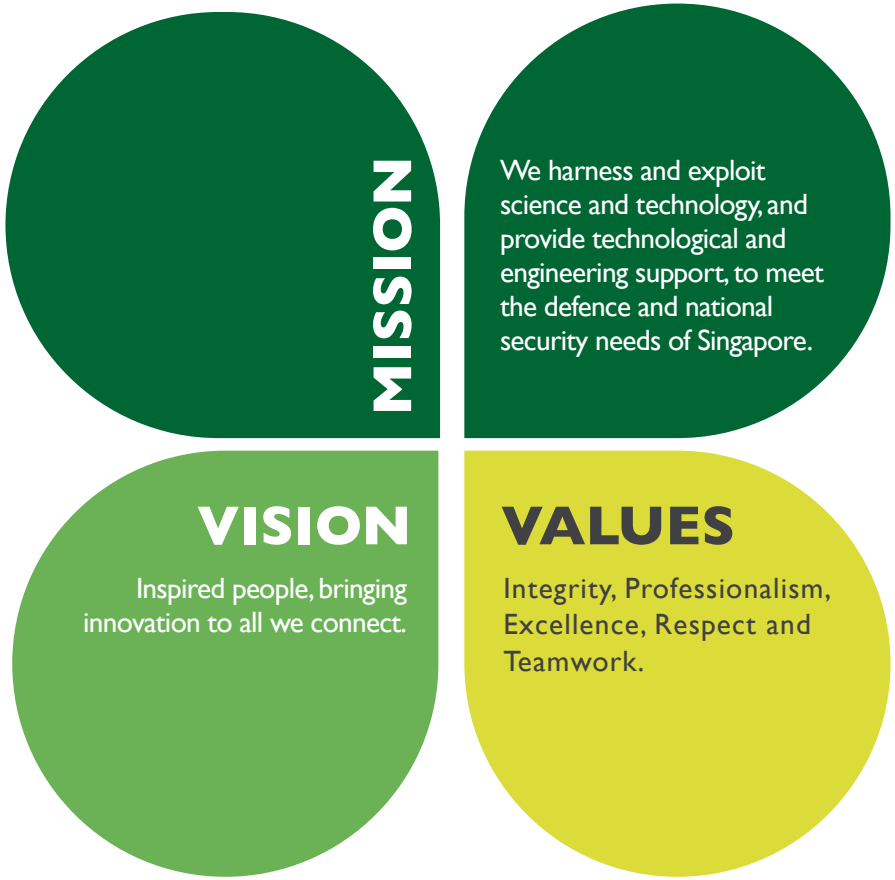
DSTA'S ENVIRONMENTAL SUSTAINABILITY PUBLIC DISCLOSURE

FY2023

CONTENTS

Information correct at the time of print.



ABOUT DSTA

The Defence Science and Technology Agency (DSTA) is a technology organisation that drives innovation and delivers state-of-the-art capabilities to make the Singapore Armed Forces a formidable fighting force.

Harnessing and exploiting science and technology, our engineers and IT professionals leverage multidisciplinary expertise to equip our soldiers with advanced systems to defend Singapore. We also contribute our technological expertise, where relevant and in line with DSTA's mandate to support the needs of public service agencies.

Our work is integral to the defence and security of our nation. Our mission, vision and values guide what we do and drive us to deliver our best.

INTRODUCTION

The Singapore Green Plan 2030, released in February 2021, is a whole-of-nation movement to advance Singapore's national agenda on sustainable development. It prioritises areas such as improving energy efficiency, increasing renewable energy use, minimising waste and creating green urban spaces. Key goals adopted include achieving net-zero emissions by 2050 and strengthening our climate resilience.

To position the public sector at the forefront of Singapore's sustainable development efforts, the GreenGov.SG initiative was introduced in July 2021. Ambitious goals were set, including achieving net-zero emissions around 2045. All statutory boards are also required to publish annual environmental sustainability disclosures starting from FY2023.

This inaugural report outlines DSTA's environmental sustainability performance for FY2023. It reflects our commitment as an organisation towards environmental sustainability, and highlights the key initiatives, policies, and practices that DSTA has implemented to minimise our environmental footprint.

DSTA'S COMMITMENT TO ENVIRONMENTAL SUSTAINABILITY

BOARD AND SENIOR MANAGEMENT STATEMENT

The DSTA Board and Senior Management recognise that environmental sustainability is an essential component of responsible governance. Entrusted with advancing Singapore's defence and national security capabilities, we align with the principles of environmental stewardship and social responsibility in delivering our mission.

DSTA endeavours to adopt green practices in our business, and foster a corporate culture of environmental sustainability. We regularly review our business processes to align with GreenGov.SG and other applicable guidelines. We harness technology and innovation to reduce carbon footprint, resource consumption and waste generation, as part of our commitment to GreenGov.SG targets. We also actively engage staff to promote environmental sustainability practices, and empower passionate individuals as Green Ambassadors to champion ground-up green initiatives.

DSTA strives to deliver environmentally sustainable outcomes for our partners. We leverage our engineering expertise to operationalise green technologies and environmentally sustainable features for the infrastructure and platforms that we deliver, without compromising defence capabilities.

GOVERNANCE STRUCTURE

DSTA's governance structure, as shown in Diagram 1, operates at three levels:

BOARD LEVEL

Provides strategic directions by setting long-term sustainability goals and ensuring alignment with national and public sector goals. DSTA's Board comprises members with diverse and extensive experience from both the private and public sectors.

MANAGEMENT LEVEL

Translates strategic directions into actionable policies and practices within DSTA and oversees the implementation of sustainability initiatives to ensure performance targets are achieved.

WORKSTREAM LEVEL

Manages the execution of environmental sustainability policies and practices across DSTA's operations, from implementation and progress tracking to driving innovation to meet DSTA's and MINDEF's environmental objectives.

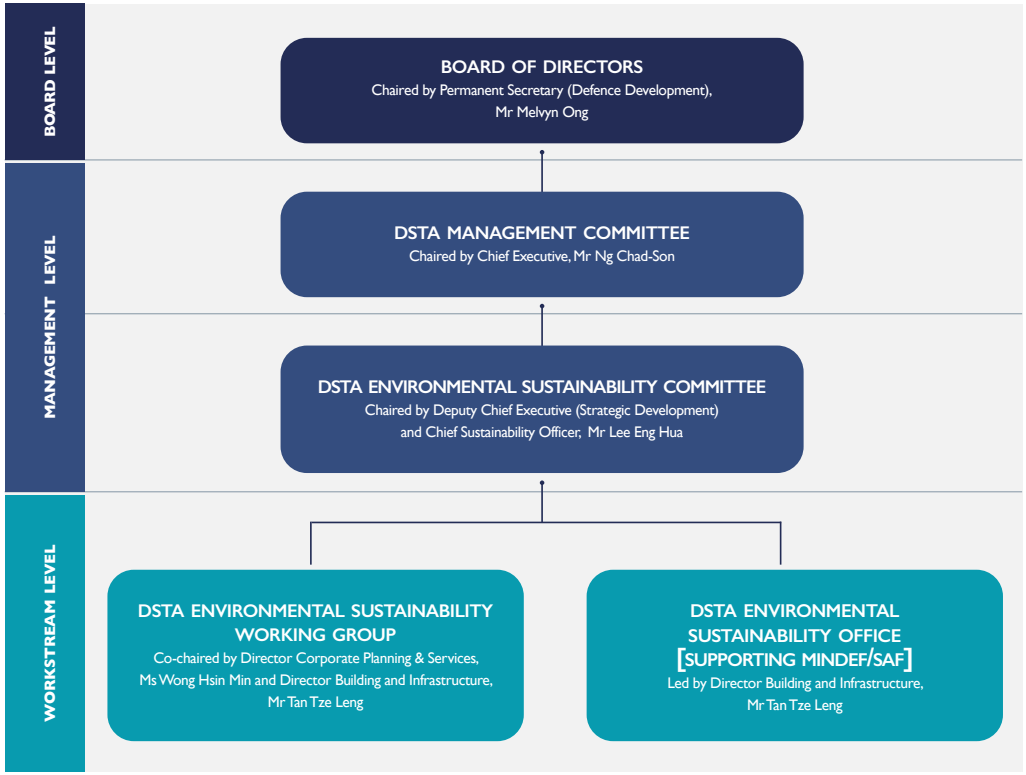


Diagram 1: DSTA's governance structure for environmental sustainability

Each level works to embed sustainability across the organisation, from strategy development to operational execution.
The roles and responsibilities of the respective committees and entities are detailed in Table 1.

Committee / Entity	Terms of Reference
Board of Directors	• Provides strategic direction and considers environmental sustainability issues in the formulation of DSTA's strategies • Provides guidance to DSTA Management in identifying environmental sustainability risks and opportunities through DSTA Enterprise Risk Management (ERM) framework
DSTA Management Committee	• Provides leadership and direction on environmental sustainability initiatives concerning DSTA
DSTA Environmental Sustainability Committee	• Oversees the alignment of DSTA's business processes and practices with GreenGov.SG measures • Oversees the development of environmental sustainability initiatives and culture within DSTA • Oversees DSTA's contribution to MINDEF/SAF's environmental sustainability outcomes • Oversees DSTA's environmental sustainability performance and reporting, as well as environmental sustainability risks under DSTA's ERM framework
DSTA Environmental Sustainability Working Group	• Initiates and implements new environmental sustainability initiatives in DSTA • Drives DSTA environmental sustainability culture • Liaises with MINDEF on GreenGov.SG reporting matters and requirements • Works hand-in-hand with DSTA Green Ambassadors to drive ground-up initiatives and encourage staff adoption of environmental sustainability practices
DSTA Environmental Sustainability Office (Supporting MINDEF/SAF)	• Supports MINDEF/SAF in the planning and governance of environmental sustainability efforts • Oversees implementation of environmental sustainability efforts for building and infrastructure projects • Coordinates environmental sustainability efforts across other domains (e.g. Air, Land, Naval, InfoComm Infrastructure)

Table 1: Terms of reference for DSTA environmental sustainability governance bodies

DSTA'S KEY THRUSTS FOR ENVIRONMENTAL SUSTAINABILITY

At DSTA, our commitment to environmental sustainability is underpinned by three key thrusts that shape our approach and guide our initiatives. This section highlights our key initiatives under each thrust in FY2023 and illustrates how they contribute to our overarching sustainability goals.

GREEN POLICIES AND PRACTICES

We adopt and embed environmental sustainability policies and practices into our core business areas, to promote sustainable operations and responsible resource management.

- Procurement
- Building Management
- Events Management
- Waste Management

TECHNOLOGY AND INNOVATION

We harness technology to enhance efficiency and drive innovative solutions to minimise resource consumption.

- Energy Conservation
- Water Conservation

CORPORATE CULTURE

We foster a culture of environmental sustainability by engaging our employees and stakeholders in our environmental initiatives and encouraging responsible practices across the organisation.

- Green Ambassador Network
- Corporate Social Responsibility

GREEN POLICIES AND PRACTICES

DSTA is committed to adopting sustainable policies and practices throughout our operations. We regularly review our business processes to align with GreenGov.SG and other applicable guidelines. This continuous evaluation enables us to meet evolving environmental sustainability standards while supporting our nation's broader sustainability agenda.

Below are some key policies and practices that we have implemented to drive positive environmental sustainability outcomes.

PROCUREMENT

Under the GreenGov.SG initiative, Singapore's public sector has committed to incorporate environmental sustainability considerations in all government procurement by 2028. DSTA has integrated the measures outlined in the GreenGov.SG initiative into our procurement processes. These measures include the purchase of white printing paper certified under the enhanced Singapore Green Labelling Scheme, office ICT equipment that meet the latest ENERGY STAR standards, and electrical appliances with high ratings under the Mandatory Energy Labelling Scheme.

BUILDING MANAGEMENT

In line with GreenGov.SG requirements, DSTA has adjusted our air conditioning system controls in the second half of FY2023 to maintain the temperature of our office premises at an average of 25°C. To continue to achieve thermal comfort for staff, we conducted a series of airflow re-balancing and re-commissioning tests. The adjustment to a higher office temperature has allowed us to lower our energy consumption.

EVENTS MANAGEMENT

To minimise environmental impact from events, DSTA introduced the 'Best Practice Guide for Organising Environmentally Friendly Events' in September 2023, taking reference from Ministry of Sustainability and the Environment's best practice guide. This guide outlines key principles for organising environmentally sustainable events, including adoption of eco-friendly venues and practices, and reduction of food waste from catering.

WASTE MANAGEMENT

Alongside change management practices, DSTA has implemented waste reduction initiatives centred on the principles of "Reduce" and "Recycle", as detailed in Table 2.

Principle	Initiatives
Reduce	**No provision of bottled water for meetings** Staff are encouraged to bring their own water bottles when attending meetings in DSTA. **No disposables for dine-in since January 2024** Single-use plastics, such as disposable containers and utensils, are no longer provided for dine-in services at our cafeteria. **Go digital towards a 'paperless' office** We have utilised a meeting application to distribute meeting materials electronically. We have also implemented digital signing to reduce hardcopies, and introduced digital watermark on printouts to track excessive printing. **On-site food waste digester** An on-site food waste digester has been deployed to manage and reduce our cafeteria food waste. In FY2023, the food waste digestor processed and diverted close to 3,700 kg of food waste from our incineration plants and landfill.
Recycle	**Recycling bins** Recycling bins have been introduced along high-footfall walkways and office pantries, making it convenient for staff to recycle. Bins are also clearly labelled to guide employees in segregating recyclable waste.

Table 2: DSTA's waste reduction initiatives

TECHNOLOGY AND INNOVATION

As a technology agency, DSTA takes pride in investing in and leveraging technology to achieve environmental sustainability cost-efficiently.

Our office building achieved the Green Mark Platinum certification in 2019, and obtained re-certification in 2022. The achievement was made possible by integrating green features to enhance resource efficiency as shown in Diagram 2.

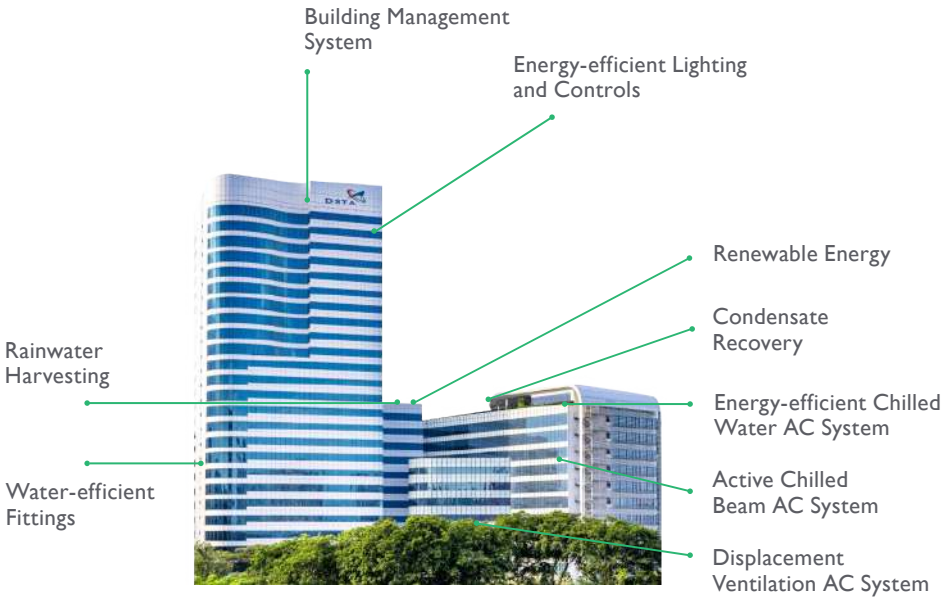


Diagram 2: Green features in DSTA

ENERGY CONSERVATION

DSTA uses a Building Management System to enable control and scheduling of lighting and air-conditioning based on set time intervals. By optimising operations based on occupancy and usage patterns, we ensure efficient use of electricity.

The building was designed with an energy-efficient chilled water air-conditioning system. A section of our office uses active chilled beam technology, which is 30% more efficient than a traditional air distribution system using Air Handling Units, because it utilises natural convection to induce air movement.

Our entrance lobby uses a displacement ventilation system with low level, low velocity air diffusers. As warm air rises, it is displaced towards and accumulates near the ceiling. This allows cooling of a smaller volume of air at habitable level, thereby minimising its energy consumption by 30%.

WATER CONSERVATION

All water fittings in our building are rated 3-ticks under the Water Efficiency Labelling Scheme. We also have a small-scale condensate recovery and rainwater harvesting system, and are looking to expand both systems. This expansion is expected to reduce our cooling tower water consumption by 20%.

CORPORATE CULTURE

DSTA is committed to fostering a culture of environmental sustainability among our staff and promoting sustainability best practices at work.

GREEN AMBASSADOR NETWORK

Launched in January 2023, the Green Ambassador Network comprises like-minded volunteers from various entities within DSTA who are eager to promote sustainable habits and raise awareness about environmental matters within the DSTA community. The network started with 16 ambassadors and expanded to 23 by the end of FY2023.

The Green Ambassadors drive the sharing of sustainability policies and updates across various communication channels. They also meet periodically with the DSTA Environmental Sustainability Working Group to discuss and implement staff suggestions to improve sustainability within our workplace.

The Green Ambassadors are instrumental in spearheading ground-up initiatives across DSTA. In FY2023, they conducted a Utility Challenge, which encouraged active staff participation and increased their awareness of sustainable practices.

CORPORATE SOCIAL RESPONSIBILITY

DSTA also promotes participation in green volunteering activities as a way to drive collective action and broaden staff awareness of sustainability efforts beyond the workplace.

In FY2023, individual DSTA entities organised five beach and park clean-ups at various locations. We also collaborated with a local social enterprise to host organisational beach clean-ups in May and November 2023. These efforts reflect our commitment to embedding sustainability into both our workplace culture and the wider community.

DSTA'S ENVIRONMENTAL SUSTAINABILITY PERFORMANCE FOR FY2023

GREENHOUSE GAS EMISSIONS

OUR COMMITMENT

Peak emissions around FY2027

DSTA aims to peak greenhouse gas (GHG) emissions around FY2027. Our emissions are expected to grow and peak by FY2027, due to increasing IT requirements and our classified nature of work which requires our data centres to be on-premise.

We will aim to taper down our emissions after FY2027 to contribute towards public sector's net zero emissions target around FY2045.

PROGRESS IN FY2023

Diagram 3 shows that our total GHG emissions have remained steady over the past three financial years. DSTA emitted 5,743 tonnes CO_2 equivalent in FY2023, 2% lower than FY2022.

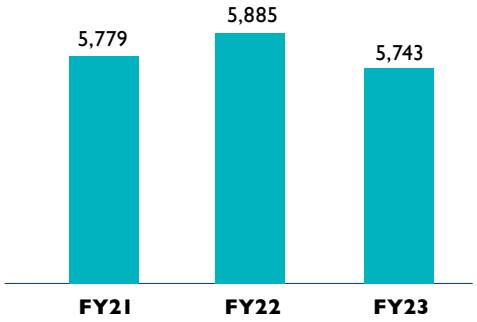


Diagram 3: DSTA's GHG emissions (tonnes CO_2 equivalent) over the financial years

Our emissions comprise mainly Scope 2 emissions from electricity consumed in our office building and data centre. In FY2023, despite an 18% increase in staff returning to office, we reduced our Scope 2 emissions by 2% compared to FY2022. This was largely due to the initiatives elaborated in DSTA's Key Thrusts for Environmental Sustainability's Section. (See page 8)

Our Scope 1 emissions contributed less than 1% of our total emissions. These arose from internal combustion engine cars leased by DSTA, and town gas used in our cafeteria.

ELECTRICITY CONSUMPTION

OUR COMMITMENT

10% reduction in Energy Utilisation Index (EUI) by FY2030

DSTA aims to reduce our EUI by 10% from the average of FY2018-FY2020 (Baseline) by FY2030. This is consistent with the GreenGov.SG target.

PROGRESS IN FY2023

Diagram 4 shows a stable EUI trend over the past three financial years.

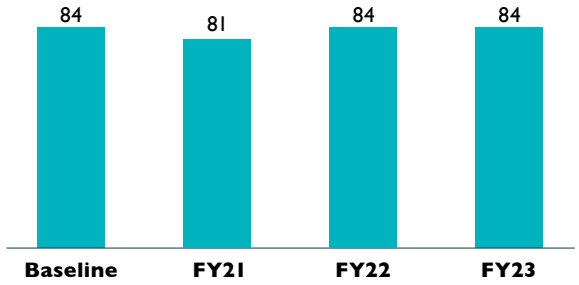


Diagram 4: DSTA's EUI (kWh/m^2/year) over the financial years

DSTA's EUI in FY2023 was 84 kWh/m^2/year, which is similar to our Baseline. While there was a 39% increase of staff returning to office in FY2023 compared to the Baseline, the increase in overall consumption was offset by improvements in our building energy efficiency.

Notwithstanding, more efforts will be required to bring down our EUI to meet the 10% reduction target by FY2030. These include upcoming infrastructure improvements, such as installation of more solar panels on the roof top, implementation of hybrid cooling and enhancements to optimise our Air Handling Unit systems.

WATER CONSUMPTION

OUR COMMITMENT

10% reduction in Water Efficiency Index (WEI) by FY2030

DSTA aims to reduce our WEI by 10% from the average of FY2018-FY2020 (Baseline) by FY2030. This is consistent with the GreenGov.SG target.

PROGRESS IN FY2023

Diagram 5 shows a consistent WEI performance in FY2022 and FY2023. In FY2022, we reduced our WEI by 25% to 124 litres/person/day. The reduction was attributed to both an increase in staff returning to office and water consumption reduction initiatives.

DSTA's WEI in FY2023 was 119 litres/person/day, 31% lower than our Baseline. Continual and sustained efforts are required to ensure that we achieve our target reduction in water use by FY2030.

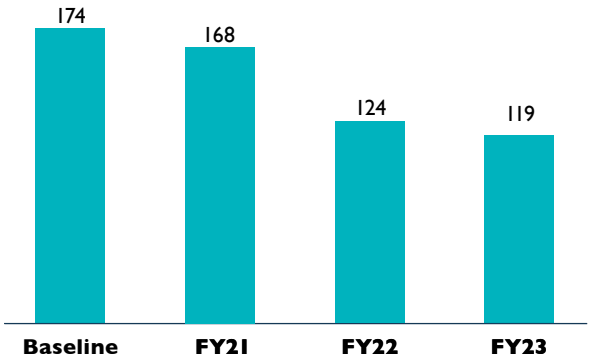


Diagram 5: DSTA's WEI (litres/person/day) over the financial years

WASTE GENERATION

OUR COMMITMENT

30% reduction in Waste Disposal Index (WDI) by FY2030

DSTA aims to reduce our WDI by 30% from FY2024 (Baseline) by FY2030. This is consistent with the GreenGov.SG target, except that our baseline year is FY2024 instead of FY2022 in GreenGov.SG.

DSTA's office shares the same Depot Road Camp compound with Ministry of Defence of Singapore (MINDEF). The Public Waste Collector weighs the waste for the entire compound, which can be apportioned between DSTA and MINDEF for disclosure purposes. However, we have assessed that directly weighing our own waste would provide a more accurate baseline and better reflect our waste reduction efforts. This effort started in August 2023.

PROGRESS IN FY2023

We have taken FY2024 to be the baseline year as this is the earliest year that we will have the full year waste data. Our WDI performance will be disclosed in subsequent reports.

APPENDIX A - PERFORMANCE DATA AND METHODOLOGY

01 | REPORTING BOUNDARY

We have set our reporting boundary aligned to the GreenGov.SG scope, which is consistent with the reporting entity used in our financial statements. Premises with negligible utilities consumption are excluded.

02 | GREENHOUSE GAS EMISSIONS CALCULATIONS

	Scope 1 Emissions (tCO_2e)	Scope 2 Emissions (tCO_2e)	Total Emissions (tCO_2e)	Change from Previous Year
FY2021	31	5,747	5,779	-
FY2022	36	5,849	5,885	+2%
FY2023	37	5,707	5,743	-2%

Table A1: DSTA's GHG emissions over the financial years

Assumptions and Methodology Used

1. Scope 2 emissions was reported net of solar energy, which was consumed onsite.

2. The following emission factors were used:
   a. Petrol: 0.00236 tCO_2e/L (Source: GreenGov.SG Emissions Calculator, 26 Oct 2023)
   b. Town gas: 0.000201 tCO_2e/kWh (Source: GreenGov.SG Emissions Calculator, 26 Oct 2023)
   c. Grid (Source: Energy Market Authority's website, Sep 2023, accessed in Jul 2024)
      i. 2018: 0.4206 $kgCO_2$/kWh
      ii. 2019: 0.4085 $kgCO_2e$/kWh
      iii. 2020: 0.4074 $kgCO_2e$/kWh
      iv. 2021: 0.4085 $kgCO_2e$/kWh
      v. 2022 onwards: 0.4168 $kgCO_2e$/kWh

03 | ELECTRICITY CONSUMPTION AND EUI CALCULATIONS

	Electricity Consumption (kWh)	EUI (kWh/m²/year)	Change from Baseline
Baseline (Avg FY2018-2020)	14,648,621	84	-
FY2021	13,998,378	81	-4%
FY2022	14,033,320	84	-
FY2023	13,691,236	84	-

Table A2: Electricity consumption and EUI over the financial years

Assumptions and Methodology Used

1. EUI is defined as the total electricity consumed in one year divided by the total gross floor area (GFA). The formula used was:

   Agency EUI in Year N = (Total amount of electricity consumed for all Agency premises in Year N)/ (Total GFA for all Agency premises in Year N)

2. Non-standard infrastructure was excluded from EUI calculation. Such infrastructure includes carparks and data centres, which do not have meaningful GFA or occupancy data. Currently, the consumption of our data centres and the associated supporting infrastructure are based on best estimates. We are working to install meters to measure this consumption more definitively and will update our figures, including our baseline figure, in future disclosures.

3. Solar electricity is consumed on site. Electricity consumption data refers to net electricity usage, which consists only of grid electricity usage.

04 | WATER CONSUMPTION AND WEI CALCULATIONS

	Water Consumption (litres)	WEI (litres/person /day)	Change from Baseline
Baseline (Avg FY2018-2020)	66,151,967	174	-
FY2021	44,908,700	168	-3%
FY2022	55,512,300	124	-29%
FY2023	61,745,900	119	-31%

Table A3: Water consumption and WEI over the financial years

Assumptions and Methodology Used

1. WEI is defined as the water consumption per day divided by the total number of staff headcount including visitors to the premises. The formula used was:

   Agency WEI in Year N = [Total amount of water consumed for all Agency premises in Year N × 1000] / [Average number of operational days in Year N for all Agency premises × (Average number of staff per day for all Agency premises + (0.25 × Average number of visitors per day for all Agency premises))]

2. Non-standard infrastructure was excluded from WEI calculation. Such infrastructure includes carparks and data centres, which do not have meaningful GFA or occupancy data. Currently, the consumption of our data centres and the associated supporting infrastructure are based on best estimates. We are working to install meters to measure this consumption more definitively and will update our figures, including our baseline figure, in future disclosures.

DSTA
Defence Science &
Technology Agency

1 Depot road
Singapore 109679

www.dsta.gov.sg
singaporedsta
DSTA